

PATENT SPECIFICATION

(11) 1433890

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C7A	713	742	783	78Y	B249	B25X	B25Y	B289	B309	B319
	B325	B327	B329	B32Y	B331	B333	B335	B337	B339	
	B33X	B349	B357	B359	B35Y	B361	B363	B365		
	B367	B369	B36X	B377	B379	B37Y	B381	B383		
	B385	B387	B389	B38X	B399	B419	B425	B427		
	B429	B42Y	B431	B433	B435	B437	B439	B43X		
	B440	B44Y	B46Y	B475	B477	B479	B481	B483	B485	
	B487	B489	B48X	B509	B50Y	B511	B513	B515		
	B517	B519	B51X	B539	B549	B559	B610	B613		
	B616	B619	B621	B624	B627	B62X	B630	B635		
	B661	B663	B665	B667	B669	B66X	B670			

(72) Inventors HAMISH DUNDAS WILSON, DAVID
FREDERICK GREEN and PETER EDWARD
VICKERY

(54) IMPROVEMENTS IN OR RELATING TO BEARINGS

PATENTS ACT 1949

SPECIFICATION NO 1433890

The following amendments were allowed under Section 29 on 25 January 1980:

Page 2, line 6, delete thickness insert width

THE PATENT OFFICE
22 February 1980

Bas 74055/9

- 20 bearing surface to the bearing housing is not impeded by the relatively low thermal conductivity of a steel backing on the bearing. Aluminium tin alloys in which the alloy content comprises 18% to 22% by weight of the whole have very good bearing properties but are relatively weak whereas aluminium alloys containing 6% tin by weight are stronger but do not have such good bearing properties.

The invention provides a method of manufacturing a bearing material comprising taking a strip consisting solely of an alloy comprising aluminium and tin in "as cast condition" and containing 18% to 22% by weight of tin, and cold rolling the strip to increase the strength of the strip.

35 The cold rolling of the strip improves the strength of the strip to a stage where the strip can be used for unbacked bearings.

It is preferred that the cold rolling of the

inch. The elongation of such strip measured using a British Standard test piece to 55 fraction is 10%.

Following the final cold rolling of the strip, the strip is blanked to form bearings such as ring or half thrust washers cylindrical bushes, conical bushes or conical washers.

The following is a description of a specific embodiment of the invention.

The starting material used is cast aluminium tin strip containing approximately 20% tin by weight having a thickness of 15 mm. The strip initially has a hardness of Rockwell H 47 to 52, an ultimate tensile strength of 4 to 6.5 tons per square inch and a British Standard test piece of the material has an elongation at fracture in the range 12 to 20%.

The strip is cold rolled to a thickness of 3.8 mm and is then annealed at 275°C for 24

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 B616 B619 B621 B624 B627 B62X B630 B635
 B661 B663 B665 B667 B669 B66X B670

(72) Inventors HAMISH DUNDAS WILSON, DAVID
 FREDERICK GREEN and PETER EDWARD
 VICKERY

(54) IMPROVEMENTS IN OR RELATING TO BEARINGS

(71) We, VANDERVELL PRODUCTS LIMITED, a British Company of Norden Road, Maidenhead, Berkshire, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to bearings and in particular to bearings, formed from alloys of aluminium and tin.

Aluminium tin alloys have thermal conductivities considerably greater than that of steel and so it is considered desirable to form unbacked bearings from aluminium tin alloys so that the heat flow from the bearing surface to the bearing housing is not impeded by the relatively low thermal conductivity of a steel backing on the bearing. Aluminium tin alloys in which the alloy content comprises 18% to 22% by weight of the whole have very good bearing properties but are relatively weak whereas aluminium alloys containing 6% tin by weight are stronger but do not have such good bearing properties.

The invention provides a method of manufacturing a bearing material comprising taking a strip consisting solely of an alloy comprising aluminium and tin in "as cast condition" and containing 18% to 22% by weight of tin, and cold rolling the strip to increase the strength of the strip.

The cold rolling of the strip improves the strength of the strip to a stage where the strip can be used for unbacked bearings.

It is preferred that the cold rolling of the

strip is followed by annealing of the strip and it is further preferred that the annealing is following by further cold rolling of the strip.

In the case where the initial hardness of the strip is Rockwell H 50 and the initial ultimate tensile strength is 5.5 tons per square inch, the first mentioned cold rolling is preferably carried out to increase the hardness to within the range Rockwell H 75 to 95 and increase the ultimate tensile strength to 7 to 12 tons per square inch.

More specifically the strip is so cold rolled that the hardness of the strip after cold rolling is Rockwell H 84 and the ultimate tensile strength is 8.2/8.4 tons per square inch. The elongation of such strip measured using a British Standard test piece to fraction is 10%.

Following the final cold rolling of the strip, the strip is blanked to form bearings such as ring or half thrust washers cylindrical bushes, conical bushes or conical washers.

The following is a description of a specific embodiment of the invention.

The starting material used is cast aluminium tin strip containing approximately 20% tin by weight having a thickness of 15 mm. The strip initially has a hardness of Rockwell H 47 to 52, an ultimate tensile strength of 4 to 6.5 tons per square inch and a British Standard test piece of the material has an elongation at fracture in the range 12 to 20%.

The strip is cold rolled to a thickness of 3.8 mm and is then annealed at 275°C for 24

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5 hours. After annealing the strip is brushed on one side to remove tin sweat and pressure rolled to reduce the thickness of the strip to within the range 2.324 to 2.337 mm. The edges of the strip are sheared to produce a final strip having a thickness of 98.425 mm.

10 The hardness of the resulting strip is Rockwell H 84, the ultimate tensile strength of the strip is 8.2/8.4 tons per square inch and the elongation of a British Standard test piece tested to fracture is 10%.

15 The strip has good bearing properties and is sufficiently strong following the cold rolling operations to be used without a conventional steel backing.

20 Following the cold working of the strip, bearings such as half-bearing liners, cylindrical bushes, thrust washers, conical bushes or conical washers can be made from material using conventional techniques.

25 It has also been found that small additions of copper, silicon, magnesium, zinc, manganese and iron in a total concentration not exceeding 5% by weight of the total strip improve the strength and bearing properties of the strip still further.

30 The strip is particularly suitable for the manufacture of thrust washers in which case radially extending oil grooves may be provided on both surfaces of the washers at the same location around the washer so that the washer can be located either way round in the housing.

35 In the specific example described above, the strip is subjected to two pressing operations to effect cold working of the strip. It is however envisaged that a single cold working operation may be used or the strip may be subjected to multiple cold working operations.

WHAT WE CLAIM IS:—

1. A method of manufacturing a bearing material comprising taking a strip consisting solely of an alloy comprising aluminium and tin in "as cast condition" and containing 18% to 22% by weight of tin, and cold rolling the strip to increase the strength of the strip. 45

2. A method as claimed in claim 1 wherein the cold rolling of the strip is followed by annealing of the strip. 50

3. A method as claimed in claim 2 wherein the annealing is followed by further cold rolling of the strip. 55

4. A method as claimed in any of claims 1 to 3 and in the case where the initial hardness of the strip is Rockwell H 50 and the initial ultimate tensile strength is 5.5 tons per square inch, the first mentioned cold rolling is carried out to increase the hardness to within the range Rockwell H 75 to 95 and increase the ultimate tensile strength to 7 to 12 tons per square inch. 60

5. A method as claimed in claim 4 wherein the strip is cold rolled such that the hardness of the strip after cold rolling is Rockwell H 84 and the ultimate tensile strength is 8.2/8.4 tons per square inch. 65

6. A method of manufacturing a bearing material substantially as described in the example set out hereinbefore. 70

7. A bearing formed from a bearing material manufactured in accordance with any of claims 1 to 6. 75

BOULT, WADE & TENNANT,
Chartered Patent Agents,
34, Cursitor Street,
London EC4A 1PQ.

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